

[0032] FIG. 2 depicts an example process 200 for handling different types of RSRQ measurements, in accordance with some example embodiments. The description of process 200 also refers to FIG. 1.

[0033] At 202, the network, such as base station 110A, may signal (via dedicated signaling and/or a broadcast) one or more offsets to a UE, such as UE 114A, in accordance with some example embodiments. The one or more offsets may be used by UE 114A for the new RSRQ measurement type. For example, the network may signal to the UE a change in power (for example, dB) to adjust a threshold parameter (or any other parameter) in order to use the new RSRQ measurement type. The offset may adjust configuration information signaled by the network specifically for the old RSRQ. In this way, the network can signal the same baseline configuration to all UE but send adjustments to those UE supporting the new RSRQ (while not affecting the legacy UE).

[0034] The signaling at 202 may be sent via dedicated RRC signaling, a broadcast, system information blocks (SIBs), and in other ways as well.

[0035] The signaling at 202 may, in some example, embodiments, specific to one or more cells, specific to one or more carriers, and/or specific to one or more measurement events.

[0036] The network may, in some example embodiments, send at 202 an explicit indication to use the new RSRQ measurement, so that the explicit indication together with the one or more offsets indicate the new RSRQ measurements is to be used at the UE. Although the signaling may explicitly indicate that the UE should use the new RSRQ measurement, the signaling at 202 may, in some example embodiments, implicitly indicate that the new RSRQ measurements are to be used by the UE. For example, the presence of the offset at 202 may signal that the UE is required to use the new RSRQ metric, when supported by the UE.

[0037] At 204, the UE 114A may determine whether the signaling received at 202 includes an explicit or implicit indication to use the new RSRQ measurement, in accordance with some example embodiments. If not, the UE 114A may continue at 205 with the old RSRQ measurement (which may be a default as noted above), in accordance with some example embodiments.

[0038] However, if the signaling does include an explicit or implicit indication to use the new RSRQ measurement, the UE 114A may activate at 206 some if not all of the one or more offsets simultaneously, in accordance with some example embodiments. Moreover, the activation may be only for certain offsets as well as deactivating certain offsets. For example, the network may provide at 202 an offset in the form of a change (or delta) to an existing measurement configuration. To illustrate further, the change may represent a value to be added (or subtracted) to the L1 or L3 filtered RSRQ measurement result or a change to the time-to-trigger of a measurement event. In this example, UE 114A may activate one or more of these received offsets by applying them to the measurement configuration to be used for the new RSRQ measurements. When the one or more offsets are activated, the UE cell re-selection behavior may be changed based on the new RSRQ measurements including the activated one or more offsets.

[0039] Moreover, the offset(s) signaled at 202 may indicate to the UE that the adjustments are for a certain cell,

group of cells, carriers, measurement events, and/or combination of any of these. For example, an offset may be for a specific cell or cells, such as cell 112C. When this is the case, the UE 114A may activate the offset to the new RSRQ measurement of cell 112C. To illustrate by way of an example, if for example, the UE is required to use an offset for the new RSRQ of certain cells (or carriers) and checks the related event-triggered or cell reselection criteria, the UE may get to know for which cells or carriers this offset needs to be used, through explicit signaling indication (explicit list of cells) or implicitly where these cells or carriers belong to a certain group like higher priority inter-frequency cells or they use a certain feature.

[0040] At 208, the UE may then proceed to make the new RSRQ measurements in accordance with the offset, in accordance with some example embodiments. The RSRQ measurements performed at 208 or 205 may also be reported at 210 to the network.

[0041] In some example embodiments, the network may signal at 202 the UE to measure the difference between old and new RSRQ metrics to be used with the RSRQ measurements. For example, the UE may need to perform both old and new RSRQ measurements and identify what the difference is (for example, in dB or other value) between new and old RSRQ measurement results. This difference in old and new RSRQ measurement results from the UE may be utilized by the network in for example network decision making with respect to radio resource management. Alternatively or additionally, a UE may be required to take some actions, if the difference between old and new RSRQ is either bigger or small than for example a certain threshold. Moreover, the UE may signal to the network the offset(s) being used at the UE with the new RSRQ metric. The network signaling may be explicit or implicit and via dedicated signaling and/or a broadcast. For example, the network may, in some example embodiments, send an explicit indication to the UE to measure the difference between old and new RSRQ metrics to be used with the RSRQ measurements. Moreover, the network may signal that the difference measurements are to be performed for a certain cell, group of cells, carriers, measurement events, and/or combination of any of these.

[0042] FIG. 3 illustrates a block diagram of an apparatus 10, in accordance with some example embodiments. The apparatus 10 (or portions thereof) may be configured to provide a user equipment, a smart phone, a communicator, a machine type communication device, a wireless device, a wearable device, a cellular phone, a wireless sensor/device (for example, a wireless device which is part of a distributed architecture in for example, a car, a vehicle, a robot, a human, and/or the like).

[0043] The apparatus 10 may include at least one antenna 12 in communication with a transmitter 14 and a receiver 16. Alternatively transmit and receive antennas may be separate. The apparatus 10 may also include a processor 20 configured to provide signals to and receive signals from the transmitter and receiver, respectively, and to control the functioning of the apparatus. Processor 20 may be configured to control the functioning of the transmitter and receiver by effecting control signaling via electrical leads to the transmitter and receiver. Likewise, processor 20 may be configured to control other elements of apparatus 10 by effecting control signaling via electrical leads connecting processor 20 to the other elements, such as a display or a